

PREVALENCE OF INTESTINAL PARASITIC INFECTION AMONG CHILDREN IN TWO VILLAGES IN LAO PDR

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Abstract. The prevalence of intestinal parasitic infection among 128 children under 15 years old in two villages in Khammouane Province, southeastern Lao PDR, was investigated. Overall prevalence of helminth infection was 77.3%; the prevalence was 64.8% in children under 6 years, 88.5% in those aged 6-10 years and 81.8% in the age group above 11 years. The prevalent helminths found in the subjects were *Ascaris lumbricoides* (48.4%), *Trichuris trichiura* (43.8%), hookworm (37.5%) and *Opisthorchis viverrini* (37.5%). Intestinal protozoan infection was demonstrated in 14.1%; *Giardia lamblia* was the most prevalent (8.6%) protozoan species.

INTRODUCTION

There has been little information published on prevalence of intestinal parasitic infection in the Lao People's Democratic Republic (Lao PDR) and most surveys in the previous reports have been carried out around Vientiane Municipality where the socioeconomic situation is relatively better in this country (Giboda *et al*, 1991 a, c; Pholsena *et al*, 1991; Scholz *et al*, 1992). In order to gain further information on the incidence in rural area, surveys on intestinal parasitic infection were conducted in two villages in Khammouane Province, located at about 350 km south-east from Vientiane, where Lao-WHO-JICA (Japan International Cooperation Agency) Primary Health Care (PHC) Project is implementing.

MATERIALS AND METHODS

The map of survey areas (Nathandong Village and Nathantong Village, Mahaxay District, Khammouane Province) is shown in Fig 1. Both areas were about 3 hours from Thakhek, capital city

of Khammouane Province, by car in the dry season. Their ethnic groups are Lao loum and their occupations are farming and fishing in the small river. Their houses are made of wood and bamboo, being constructed at a height of 1 or 2 meters from ground to avoid flood in the rainy season. There is no toilet in the house and evacuation is done in the bush around the house.

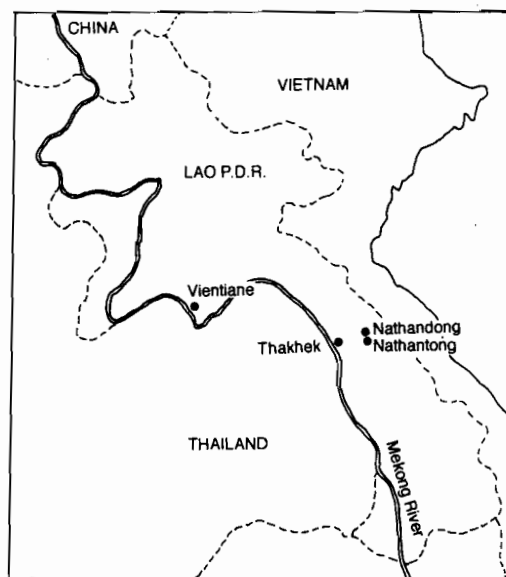


Fig 1—A map showing the survey site.

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Stool samples were collected from 128 children aged less than 16 years old in the villages. Stools were fixed in 10% formalin within 6 hours after collection and examined by formalin-ether concentration method for the presence of helminth eggs and protozoan cysts.

RESULTS

Six helminth and four protozoan species were detected among the children examined. The results on positive rates of these parasites are summarized in Table 1. The infection with helminths was

Table 1
Prevalence of intestinal parasites among children in two villages, Mahaxay, Khammouane.

		0-5 years old (%)	6-10 years old (%)	11-15 years old (%)	Total (%)
Nathandong	Male	14	15	7	36
	Female	13	14	7	34
	Total	27	29	14	70
Helminths		22 (81.5)	27 (93.1)	10 (71.4)	59 (84.3)
<i>Ascaris lumbricoides</i>		21 (77.8)	13 (44.8)	9 (64.3)	43 (61.4)
<i>Trichuris trichiura</i>		9 (33.3)	18 (62.1)	6 (42.9)	33 (47.1)
Hookworm		7 (25.9)	12 (41.4)	7 (50.0)	26 (37.1)
<i>Opisthorchis viverrini</i>		6 (22.2)	15 (51.7)	6 (42.8)	27 (38.6)
Intestinal fluke		1 (3.7)	4 (13.8)	2 (14.3)	7 (10.0)
Unknown egg like <i>Fasciola</i>		1 (3.7)	1 (3.4)	0 (0.0)	2 (2.9)
Protozoa		0 (0.0)	6 (20.7)	1 (7.1)	7 (10.0)
<i>Entamoeba histolytica</i>		0 (0.0)	2 (6.9)	0 (0.0)	2 (2.9)
<i>Entamoeba coli</i>		0 (0.0)	2 (6.9)	0 (0.0)	2 (2.9)
<i>Giardia lamblia</i>		0 (0.0)	1 (3.4)	1 (7.1)	2 (2.9)
<i>Blastocystis hominis</i>		0 (0.0)	2 (6.9)	0 (0.0)	2 (2.9)
Nathantong	Male	13	13	2	28
	Female	14	10	6	30
	Total	27	23	8	58
Helminths		13 (48.1)	19 (82.6)	8 (100)	40 (68.9)
<i>Ascaris lumbricoides</i>		8 (29.6)	9 (39.1)	2 (25.0)	19 (32.7)
<i>Trichuris trichiura</i>		6 (22.2)	12 (52.2)	5 (62.5)	23 (39.7)
Hookworm		3 (11.1)	13 (56.5)	6 (7.5)	22 (37.9)
<i>Opisthorchis viverrini</i>		7 (25.9)	10 (43.4)	4 (50.0)	21 (36.2)
Intestinal fluke		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Unknown egg like <i>Fasciola</i>		1 (3.7)	0 (0.0)	0 (0.0)	1 (1.7)
Protozoa		3 (11.1)	6 (26.0)	2 (25.0)	11 (19.0)
<i>Entamoeba hartmanni</i>		0 (0.0)	0 (0.0)	1 (12.5)	1 (1.7)
<i>Entamoeba coli</i>		2 (7.4)	0 (0.0)	0 (0.0)	2 (3.4)
<i>Giardia lamblia</i>		1 (3.7)	6 (26.1)	2 (25.0)	9 (15.5)

demonstrated to be as high as 84.3% of the subjects in Nathandong and 68.9% in Nathantong, respectively. The most common parasite detected was *Ascaris lumbricoides* (48.4%) followed by *Trichuris trichiura* (43.8%), *Opisthorchis viverrini* (37.5%) and hookworm (37.5%). The prevalence rates were generally lower in Nathantong than in Nathandong, showing 32.7% of positive rate for *A. lumbricoides* infection, which was about a half that in Nathantong. *Strongyloides* infection, which is a common parasitic infection in Southeast Asia, could not be confirmed among the children although coproculture for detection of living larvae was not applied in the surveys. As to the protozoan infection, parasites were found infected 10.0% in Nathandong and 18.9% in Nathantong. The prevalence rates, however, were consistently low, as compared to helminth infection. *Giardia lamblia* only showed relatively high positive rate of 15.5% among the subjects in Nathantong.

The above positive rate of intestinal parasites among infants under 5 years old has already reached 81.5% in Nathandong. Although the incidence in the same age group was still 48.1% in Nathantong, it increased to 82.6% in the following 5 years. The infection with *O. viverrini* was confirmed in about 25% of infants under 5 years old; the lowest age of the infant infected was 2 years old. The rate reached over 40% in the following 5 years. In Nathandong, eggs of undefined flukes were observed in 10% of the subjects.

DISCUSSION

In the present surveys in rural areas of Lao PDR, as high as 77.3% prevalence rate of helminth infection was confirmed in children under 15 years old. The prevalence rate was lower than those in other surveys in which 76-97% positive rates of helminth infection were reported among the subjects aged 15 years old or more (Pholsena *et al*, 1991; Giboda *et al*, 1991c). The difference may be attributable to the fact that children less than 16 years old were examined in the present survey. The high prevalence rate may be due to low sanitary conditions in the survey areas; they are not supplied with tap water, play barefoot and evacuate near the house. The difference in prevalence may also be due to the different method applied; the formalin-ether concentration method was used in the present surveys

but thick smear (Kato-Katz) method was applied in the other surveys. As to the intestinal protozoan infection, there has been no report in the country, because formalin-ether concentration methods, which are most effective to detect protozoan cysts in stools is not yet a common method for routine examination. In this country, it seems that the differential diagnosis of protozoan infection has not been established until now.

Helminth infections were highly prevalent even though children under 15 years old were examined in the present surveys. In Nathandong, the prevalence rate was as high as 81% in infants under 5 years old. It was surprising that *O. viverrini* infection by ingestion of raw fish has already occurred in about 25% of the children under 5 years old. The prevalence rate then increased to 40% in the following 5 years and it is known to reach nearly 100% in the adults (Pholsena *et al*, 1991). The increasing tendency may be similar to that in the neighboring northeast Thailand (Sithiathaworn *et al*, 1991; Maleewong *et al*, 1992). *O. viverrini* infection is a serious public health problem in this country because of its extremely high prevalence (Pholsena *et al*, 1991; Giboda *et al*, 1991c) and also because of its serious pathogenicity (Elkins *et al* 1990; Mairiang *et al*, 1992). High incidence of *O. viverrini* infection in the children may be a risk factor to produce serious liver dysfunction after long-standing infection. In Nathandong, eggs of undefined flukes were observed in 10% of the subjects. Giboda *et al* (1991b) and Scholz (1992) have reported the prevalence of some heterophyid trematodes in the country. Differentiation of these eggs from *O. viverrini* eggs can be a parasitologic and clinical examination problem, although serological examination has been suggested as a helpful tool for correct diagnosis of the small fluke infections (Ditrich *et al*, 1991).

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